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U. S. Department of Transportation
Docket Management System
1200 New Jersey Ave., SE,
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Subject: Guardian Agriculture Petition for Exemption Pursuant to 49 U.S.C. 44807 and 14 C.F.R. Part 11 to Authorize Commercial Agricultural-Related Services with the Guardian Agriculture MOE UAS

To Whom it May Concern:

Pursuant to 49 U.S.C. 44807 and 14 C.F.R. Part 11, Kiwi Technologies, Inc. d/b/a Guardian Agriculture (Guardian Agriculture), by and through undersigned counsel, hereby applies for a Grant of Exemption from the Federal Aviation Regulations (FARs) identified below to allow Guardian Agriculture to operate its proprietary MOE UAS, which is a large multi-rotor electric vertical take-off and landing (eVTOL) aircraft with a fully-loaded take-off weight of 494 pounds. The MOE UAS is designed to provide aerial application services in the delivery of crop protection products in connection with a Part 137 agricultural aircraft operation.

The proposed operations in this Petition for Exemption are similar to the agricultural operations conducted by DroneSeed Co. in Exemption No. 17936 ("the DroneSeed Exemption") and Yamaha Motor Corporation, USA in Exemption No. 11448 ("the Yamaha Exemption").

In support of this Petition for Exemption, Guardian Agriculture will submit the following associated UAS operating documents:

- Guardian Agriculture Concept of Operations (CONOPS);
- Guardian Agriculture MOE RPIC Training Syllabus;
- Guardian Agriculture MOE Operations and Maintenance Handbook;
- Guardian Agriculture Operational Risk Assessment; and
- Guardian Agriculture MOE Pocket Checklist.

These documents will be submitted on a confidential basis under separate cover pursuant to 14 C.F.R. § 11.35(b), as the documents contain confidential commercial and proprietary information of Guardian Agriculture. The information contained in this material is not generally

available to the public and is protected from release under the Freedom of Information Act, 5 U.S.C. § 552 *et seq.*

I. BACKGROUND OF PETITIONER AND DESCRIPTION OF PROPOSED UAS OPERATIONS

Guardian Agriculture is an American company leading agricultural innovation to make farming more sustainable and efficient. Guardian Agriculture manufactures the MOE UAS, a large eVTOL multi-rotor UAS that is designed specifically for conducting Part 137 agricultural spraying operations in rural low-risk operating environments. Guardian Agriculture's eVTOL UAS is manufactured in the United States and designed to supplement or replace existing crewed aircraft agricultural operations while also substantially increasing pilot and worker safety. Guardian Agriculture's delivery system and operational workflows enhance safety for personnel and the public as compared to existing crewed aerial applications. The UAS' level of automation, integration of GIS data, and unit economics enable a greater degree of precision application than have been previously attainable through traditional application methods. Additionally, the UAS is environmentally friendly, as it is battery powered and creates no CO2 emissions.

By way of background, Guardian Agriculture intends to pursue type certification of its MOE UAS. To support certification activities, Guardian Agriculture previously applied for a SAC-EC for purposes of research and development (R&D) and crew training in accordance with 14 C.F.R. §§ 21.191(a) and 21.191(c), respectively. The SAC-EC for the MOE UAS was issued on December 1, 2021. Guardian Agriculture currently has a separate pending Part 11 Petition for Exemption¹ seeking relief necessary to operate the UAS for R&D and crew training purposes.

The proposed commercial operations with the MOE UAS will occur solely in remote agricultural environments and over private property with permission from the property owner or controller. The MOE UAS will not be operated further than 1 nautical mile from the remote pilot in command (RPIC) and the RPIC will be capable of maintaining visual line of sight (VLOS) of the UA throughout the entire flight operation. At least one visual observer (VO) will also be used for all operations. Additionally, the MOE UAS is firmware limited, restricting operations to below 100 feet AGL and under 25 knots.

In accordance with 14 C.F.R. § 11.81(a), the contact information for Petitioner is as follows:

Guardian Agriculture
Attn: Kevin McDonald
23R Rainin Rd
Woburn, MA 01801
Phone: 817-403-4570

¹ Docket No. FAA-2021-0915.

Email: kevin@guardian.ag

II. DESCRIPTION OF UAS

The Guardian Agriculture MOE is a highly-automated battery powered VTOL UAS configured as a quadcopter. The aircraft utilizes up to 4 propulsion nacelles for both main propulsion and maneuvering, and has a fully-loaded take-off weight of 494 lbs (empty weight 236 lbs).

The aircraft will typically operate a series of short duration flights and has a maximum endurance of up to 12 minutes depending on payload weight. The maximum operating speed is 29 kts and the maximum operating altitude is firmware limited to 100 feet AGL. Upon returning to a designated landing pad, the aircraft will be reloaded with an agricultural product and have a new rechargeable traction battery installed before performing a successive flight.

At all times while powered on, the aircraft also reports important diagnostic and condition data back to the operator via integrated high reliability, low latency, bidirectional data links. Real-time data feedback includes temperature data, battery information, and other vital information required for real-time condition-based evaluation. A specially engineered low latency, high reliability data channel separates and prioritizes Command and Control (C2) traffic on the network. The C2 channel is reserved for traffic necessary for RPIC supervision and provides the mechanism to assert control over the aircraft and remove traction power from the motors, if necessary and appropriate. The data link has redundant antennae, RF amplifiers, and RF receivers. Interruption of C2 traffic on this data link is handled safely by the Flight Termination System (FTS). The aircraft will also be remote ID compliant with the addition of a 3rd party remote ID broadcast module.

The aircraft has three on-board computers: the Chassis Controller, the Flight Controller, and the FTS. The Chassis Controller (CC) performs flight mode control, spray control, data logging, real-time data feedback, and high-level mission sequencing functions. The Flight Controller (FC) is a Pixhawk running the PX4 open-source flight control stack. The FC runs a minimally modified version of PX4 that Guardian Agriculture has extended to support the motor controller, data logging, and craft-level fallback control mode requirements to detect and gracefully handle CC failure modes. The FTS is a high-reliability compute element that acts as an independent safety monitor to enable and enforce craft supervision by RPIC under all conditions. The FTS controls the power states of the high-voltage propulsion power system and actuates safety-related craft lighting. The FTS responds to command traffic from the Wireless Emergency Stop (WES) operator interface, which is under command of the RPIC.

When the propulsion system is active, the aircraft employs a lighting system that includes a TSO-approved ACS beacon. There is also auxiliary lighting to aid in RPIC situational awareness. The auxiliary lighting includes, but is not limited to, Aircraft Orientation Visual

Indicators, Traction Battery Live Visual Indicator, Aircraft Safe to Approach Indicator, and an Aircraft Summary Alarm Visual Indicator. The aircraft's electronics have a redundant power source, including a back-up battery that maintains power to all electronics when the main traction battery is disconnected or when the primary Isolated DC to DC Converter, fed from the main traction battery, is in a fault state.

The aircraft's payload is of modular design to isolate agricultural products from interacting with conflict payloads and allows the aircraft to be refitted for different missions as they are required. For the example of a liquid payload, a targeted payload function is an agricultural liquid spray system that carries a fluid payload. The spray system includes industry-proven components, including pumps and nozzles, to affect a spray efficacy compatible with the U.S. Agricultural market and regulations. For the example of a solid payload, a secondary payload function is an agricultural granular solid spreader system that carries a pelletized or granular load. This spreader system includes compatibility with dry solid agricultural products such as solid fertilizers, seeds, inoculants, and other soil improvement products. The mechanism in both cases above involves an electric-powered distribution system powered in the same method as the main propulsion system.

III. REGULATIONS FROM WHICH EXEMPTION IS SOUGHT

Guardian Agriculture seeks an exemption from the following interrelated provisions of 14 C.F.R. Parts 61, 91 and 137:

FAR	Description
§ 61.3(a)(1)(i)	Requirement for certificates, ratings, and authorizations.
§ 91.7(a)	Civil aircraft airworthiness.
§ 91.119(c)	Minimum safe altitudes: General.
§ 91.121	Altimeter settings.
§ 91.151(b)	Fuel requirements for flight in VFR conditions.
§ 91.403(b)	General.
§ 91.405(a)	Maintenance required.
§ 91.407(a)(1)	Operation after maintenance, preventive maintenance, rebuilding, and inspections.
§ 91.409(a)(1) and (2)	Inspections.
§ 91.417(a) and (b)	Maintenance records.
§ 137.19 (c), (d) and (e)(2)(ii)(iii) and (v)	Certification requirements
§ 137.31	Aircraft requirements
§ 137.33	Carrying of certificate
§ 137.41(c)	Personnel, Pilot in command

§ 137.42

Fastening of safety belts and shoulder harnesses

Listed below are the specific Federal Aviation Regulations (FARs) sections from which an exemption is sought, the rationale for why an exemption is needed, and a brief summary of the operating procedures and safeguards. The CONOPs described here and described more fully in the operating documents being submitted under separate cover, will ensure that the proposed operations can be conducted at a level of safety that is at least equal to that provided by the rule from which exemption is sought.

For ease of review, this section divides the FARs from which exemption is sought into four main categories: (1) FARs pertaining to the pilot certificate; (2) FARs pertaining to the UAS; (3) FARs pertaining to UAS Operating Parameters, and; (4) FARs pertaining to Part 137 Operating Parameters.

To expedite the FAA's safety assessment of the proposed UAS operations, except where explicitly noted, Guardian Agriculture agrees to conduct the proposed operations in accordance with the same applicable conditions and limitations (Limitations) included in the Yamaha Exemption. One distinction from the Limitations in the Yamaha Exemption relates to fuel reserve requirements. As discussed further in the section addressing the requested relief from the fuel reserve requirement in § 91.151(b), Guardian Agriculture proposes a fuel reserve requirement of 20% max available battery charge, rather than the five minute reserve required by the Limitations in the Yamaha Exemption. A second distinction relates to the certificate that must be held by the RPIC. As discussed below, Guardian Agriculture seeks relief from §§ 137.19(c) and 61.3(a)(1)(i), to the extent necessary to allow for the use of a RPIC holding a Part 107 remote pilot certificate, rather than a certificate issued under Part 61.

A. FARs Pertaining to the Pilot Certificate

§ 137.19(c) Certification requirements

§ 61.3(a)(1)(i) Requirement for certificates, ratings, and authorizations

Section 137.19(c) requires Part 137 operators to have available the services of at least one person who holds a current U.S. commercial or airline transport pilot certificate and who is properly rated for the aircraft to be used. Guardian Agriculture requests an exemption from § 137.19(c) to the extent necessary to permit persons holding a remote PIC certificate with small UAS rating to act as RPIC for commercial agricultural aircraft operations when utilizing the MOE UAS to conduct the operations. Given the unique design and highly-automated operation of the MOE UAS, the training and knowledge requirements associated with holding a pilot certificate issued under Part 61 are unnecessary. Additionally, since the proposed operations will be conducted under Part 91 and Part 137 (rather than Part 107) and because Part 91 is predicated on the presumption that the pilot holds an airman certificate under Part 61, an exemption from the

requirement in § 61.3(a)(1)(i) that the RPIC holds a pilot certificate issued under Part 61 is also necessary.

Consistent with prior exemptions issued by the FAA, an equivalent level of safety will be maintained given: (1) the fact that all pilots conducting the proposed operations will need to demonstrate compliance with relevant knowledge and skill requirements in § 137.19; (2) the low risk environment in which the proposed operations will occur; and (3) Guardian Agriculture's comprehensive pilot hiring, training, and testing protocols. In the DroneSeed Exemption, the FAA relied upon such factors to support its finding that the petitioner's proposed Part 137 agricultural operations could be conducted safely using a RPIC holding a Part 107 remote pilot certificate:

"The FAA bases its decision to require holders of a remote pilot in command certificate to complete operations under this exemption on the fact that the petitioner would consistently engage in comprehensive pilot and VO hiring, training, and certification requirements. These requirements include pre-hire interview and screening, logbook review and reference checks, skills test, and a comprehensive training course tailored for the proposed operations that includes theory and practical components, a pilot theory exam, and supervised operational familiarization training on agricultural spraying. Additionally, completion of DroneSeed's training program requirements includes examination, flight test, and continued periodic training even after certification to include specific upgrade training for PIC prior to being allowed to oversee flight operations.

Based on the specific requirements imposed by the remote pilot in command certificate, the petitioner's hiring, training and testing protocols, the knowledge and skill requirements in § 137.19, the remote location and extremely low altitude operating environment, the FAA concludes pilots who hold a remote pilot in command certificate can safely conduct the proposed operations. In this regard, all pilots conducting operations under this exemption must hold a current remote pilot in command certificate pursuant to 14 CFR § 107.12 and maintain currency per 14 CFR § 107.65 while operating both types of UAS to which this exemption applies. As a result, the FAA has determined that the conduct of the operation by pilots holding remote pilot in command certificates would not adversely affect safety.²"

Similar factors also support Guardian Agriculture's requested relief from the certificate requirements in §§ 61.3(a)(1)(i) and 137.19(c). Guardian Agriculture will recruit and retain RPICs and VOs which already possess a Part 107 certificate in good standing, or who have prior experience operating agricultural aircraft. Prospective RPICs will also possess a valid FAA Class II Medical certificate and have prior experience operating UA. Guardian Agriculture will leverage the resources provided through membership in industry organizations such as National

² DroneSeed Exemption at 13.

Agricultural Aviation Association (NAAA), Association of Unmanned Vehicle Systems International (AUVSI), and Commercial Drone Alliance (CDA).

The highly automated nature of the MOE UAS, and the remote and rural environment of operations precludes the necessity for a part 61 certificate. Operations will be conducted in sparsely populated areas, away from people, vehicles and infrastructure and below 100' in low density Class G airspace. However, the Chief Supervisor of Agricultural Operations shall hold a part 61 certificate and shall be proficient in the knowledge and skill requirements of § 137.19.

All new RPICs and VOs will undergo an intensive training syllabus, the Guardian Agriculture MOE RPIC Training Syllabus which was modeled after the FAA Industry Training Standard. The training syllabus includes 50+ hours of ground and flight instruction to ensure all employees are adequately prepared to safely operate the system. Additional efforts are underway to collaborate with Eagle Vistas Ag Pilot Training School located in Inverness, Florida to strengthen the training program and include principles of aerial application applicable to UAS operations.

Upon completion of the Guardian Agriculture training syllabus, all new employees, whether RPIC or VO, will be required to perform field operations in the VO role. Once the employee's Operations Manager determines that the individual has demonstrated sufficient knowledge of the MOE UAS, the Chief Supervisor of Agricultural Operations will test the prospective RPIC in the knowledge and skill requirements in § 137.19. Only upon successful completion the employee will be granted privileges to operate the MOE UAS as RPIC.

For the reasons discussed above, an equivalent level of safety can be maintained using a RPIC that holds a Part 107 remote pilot certificate, and an exemption from certificate requirements in §§ 137.19(c) and 61.3(a)(1)(i) is therefore appropriate.

B. FARs Pertaining to the Uncrewed Aircraft System

§ 91.403(b) *General*

§ 91.405(a) *Maintenance required*

§ 91.407(a)(1) *Operation after maintenance, preventive maintenance, rebuilding, or alteration*

§ 91.409(a)(1) and (2) *Inspections*

§ 91.417(a) and (b) *Maintenance records.*

Guardian Agriculture seeks an exemption from the following maintenance and inspection-related FARs: §§ 91.403(b) 91.405(a) *Maintenance required*, 91.407(a)(1) *Operation after maintenance, preventive maintenance, rebuilding, or alteration*, 91.409(a)(1) and (2) *Inspections*, and 91.417(a) and (b) *Maintenance records*. These regulations specify maintenance, inspection, and records standards in reference to Part 43. An exemption from these regulations is needed because these sections apply to an aircraft with an airworthiness certificate, which the MOE UAS

will not have, and because compliance with these regulatory provisions in the context of UAS operations is not feasible.

Guardian Agriculture also seeks relief from § 91.403(b), which states that no person may perform maintenance, preventive maintenance, or alterations on an aircraft other than as prescribed in Subpart E of Part 91 and other applicable regulations, including Part 43, is also needed as it relates to the issue of *who* may perform maintenance and approve the aircraft for return to service following that maintenance. While Part 43 does not apply to an aircraft without an airworthiness certificate, per the applicability requirements in Part 91, Subpart E found in § 91.401, § 91.403(b) would apply to the MOE UAS and an exemption is therefore required.³

An equivalent level of safety to these maintenance, inspection, and recordkeeping requirements, including requirements relating to personnel that may perform such requirements, will be achieved because these activities will be performed in accordance with the Guardian Agriculture MOE Operations and Maintenance Handbook. Additionally, under the Limitations in the Yamaha Exemption that will be adhered to, the RPIC will conduct a pre-flight inspection of the UAS and all associated equipment to account for all discrepancies and/or inoperable components. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft will be prohibited from operating until the necessary maintenance has been performed and the aircraft is found to be in a condition for safe flight. A functional test flight will also be conducted in a controlled environment following the replacement of any flight critical components, and, as required by the operating documents, the RPIC who conducts the functional test flight will make an entry in the UAS aircraft records of the flight. In addition, Guardian Agriculture will comply with the maintenance and inspection requirements for the UAS and its components as described in the MOE Operations and Maintenance Handbook. The MOE Operations and Maintenance Handbook addresses daily maintenance requirements, includes a maintenance schedule defining regular maintenance and inspection intervals for the aircraft and its components, and addresses testing and inspection criteria following maintenance.

Guardian Agriculture has also developed comprehensive pre-flight checklists that will identify any UAS components requiring maintenance. Moreover, as described further in the Maintenance Handbook and MOE RPIC Training Syllabus, RPICs will be trained and certified by Guardian Agriculture to perform the maintenance functions described in the Maintenance Handbook. In conjunction with the operational safeguards described in the Guardian Agriculture Operational Risk Assessment, Guardian Agriculture will achieve a level of safety equal to or greater than that provided by §§ 91.403(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b).

³ See e.g., Exemption No 18596 issued to Overwatch Aero, LLC at 14 (Docket No. FAA-2018-0857).

C. FARs Pertaining to Uncrewed Aircraft System Operating Parameters

§ 91.7(a) Civil aircraft airworthiness

Inasmuch as there will be no airworthiness certificate issued for the UAS, Guardian Agriculture seeks an exemption from § 91.7(a) *Civil aircraft airworthiness*, which requires that a civil aircraft be in an airworthy condition to be operated. While the UAS operated by Guardian Agriculture will not have an airworthiness certificate, consistent with the FAA's determination in the Yamaha Exemption, the RPIC may determine the UA is in an airworthy condition prior to flight. As described more fully in the operating documents, this is achieved through adherence to the maintenance and inspection procedures in the Guardian Agriculture MOE Maintenance Manual and MOE Pocket Checklist submitted under separate cover.

§ 91.119(c) Minimum safe altitudes

Guardian Agriculture also seeks an exemption from § 91.119(c) *Minimum safe altitudes*, to the extent necessary to allow UAS operations over *other than congested areas* at altitudes lower than those permitted by rule. The ability to operate at those altitudes is one of the key benefits of using UAS for the proposed agricultural activities. An equivalent or greater level of safety will be achieved given the remote, rural and controlled agricultural locations where the proposed operations will occur.

As described in the operating documents, Guardian Agriculture's UAS is firmware limited to a maximum operating altitude of 100 feet AGL. To the extent an applicable ATO-issued COA designates a lower maximum operating altitude, the altitude requirements of the ATO-issued COA will be complied with. In the extremely remote and secure environment where Guardian Agriculture operations occur, flying at a low altitude increases the aircraft's efficiency, without posing any increased risk to people or property. Even at these low altitudes, Guardian Agriculture's UAS operations will be conducted at a level of safety equal to or greater than that achieved by a larger crewed aircraft performing similar activities at the altitudes required by § 91.119.

§ 91.121 Altimeter settings

Guardian Agriculture also requests an exemption from § 91.121 *Altimeter settings*, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure. In the Yamaha Exemption, the FAA stated that an equivalent level of safety to the requirements of § 91.121 can be achieved in circumstances where the RPIC uses an alternative means for measuring and reporting UA altitude, such as global positioning system (GPS). As discussed more fully in the CONOPS, the MOE UAS has three methods of localization that each supply the Flight Controller with information about the position, orientation, and motion of the airframe, including an RTK-enabled DGPS with on-site RTK ground control point, Inertial Measurement

Unit (IMU), and machine vision with ground-based fiducials. These sensing modalities operate simultaneously, providing both improved accuracy and fault tolerance and the RPIC will check the UA altitude reading prior to each take-off, effectively zeroing the UA's altitude at that point. Consistent with previously granted exemptions, these requirements ensure that an equivalent level of safety will be achieved, and an exemption from the requirements of § 91.121 is therefore appropriate.

§ 91.151(b), *Fuel requirements for flight in VFR conditions*

Guardian Agriculture seeks an exemption from § 91.151(b) *Fuel requirements for flight in VFR conditions*, which would otherwise require a 20-minute fuel reserve to be maintained. As described in further detail in the CONOPS submitted under separate cover, the MOE UAS will typically operate with short flights limited by either its nominal endurance time (~12 minutes) or payload depletion, whichever occurs first. The FAA has previously determined that a requirement prohibiting the RPIC from beginning a UAS flight unless (considering wind and forecast weather conditions) there was enough available power for UAS to operate for the intended operational time and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater would ensure an equivalent level of safety to the fuel requirements of § 91.151.⁴ In lieu of the five minute reserve required in the Yamaha Exemption, Guardian Agriculture proposes a minimum fuel/power reserve of 20% max available UA battery charge. The proposed operating conditions are always VLOS under VMC conditions, in undeveloped, sparsely populated and/or agricultural fields. Additionally, the UA will not operate beyond a 1 nm range from the RPIC. Given these factors, a 20% fuel reserve will be more than adequate to provide sufficient time for the RPIC to designate a suitable alternate landing site if necessary, transit to that point and land, and will therefore provide an equivalent level of safety to the fuel reserve requirement in 91.151(b).

D. FARs Pertaining to Part 137 Certification Requirements

Guardian Agriculture seeks an exemption from the following FARs in Part 137 §§ 137.19(d) and (e)(2)(ii)(iii) and (v) *Certification requirements*, 137.31 *Aircraft requirements*, 137.33 *Carrying of certificate*, 137.41(c) *Personnel*, and 137.42 *Fastening of safety belts and shoulder harnesses*. An exemption from these FARs is necessary because the provisions are either not compatible with or are unnecessary in the context of the proposed UAS operations.

⁴ See Yamaha Exemption at 16.

§ 137.19(d) *Certification requirements*

§ 137.31(a) *Aircraft requirements*

Section 137.19(d) states the applicant for an agricultural aircraft operator certificate must have at least one certificated and airworthy aircraft, equipped for agricultural operation. Relief from this provision is necessary because the MOE UAS will not have an airworthiness certificate. Consistent with prior FAA analysis in other exemptions authorizing Part 137 agricultural operations involving UAS over 55 pounds, Guardian Agriculture will be capable of ensuring that the UAS are in a condition for safe operation based upon a thorough pre-flight inspection and compliance with the operating documents. Section 137.31(a) *Aircraft requirements*, requires aircraft operated under Part 137 to meet the requirements of § 137.19(d) and therefore an exemption will be required from this interrelated provision.

§ 137.19(e)(2)(ii), (iii), and (v) *Certification requirements*

§ 137.41(c) *Personnel*

Guardian Agriculture seeks an exemption from the knowledge and skill test requirements in § 137.19(e)(2)(ii), (iii), and (v) *Certification requirements*, because those requirements are not compatible or applicable to Guardian Agriculture's proposed UAS operations. Consistent with the FAA's analysis in the DroneSeed Exemption, demonstration of the skill described in these paragraphs is not necessary because they are not compatible with the operation of the MOE UAS during the proposed agricultural aircraft operations. Guardian Agriculture's RPIC training requirements contained in the MOE RPIC Training Syllabus will provide RPICs with the necessary skills to operate the MOE UAS safely in agricultural aircraft operations. For this reason, granting relief from a demonstration of the skills described in § 137.19(e)(2)(ii), (iii), and (v) does not adversely impact safety because the operations of the MOE UAS would not include any exercise of those maneuvers. Additionally, Guardian Agriculture's pilots will need to demonstrate all other skill requirements in § 137.19(e)(2) from which an exemption is not being sought, as required for certification as an agricultural aircraft operator under Part 137.

For the same reasons as those referenced above, Guardian Agriculture also seeks an exemption from the pilot certificate requirements of § 137.41(c), *Personnel*, as § 137.41(c) prohibits any person from acting as pilot in command of an aircraft unless that person holds a pilot certificate and rating prescribed by § 137.19(b) or (c), as appropriate for the type of operation conducted. Section 137.41(c) further requires the pilot in command to fulfill the knowledge and skill requirements of § 137.19(e). Guardian Agriculture seeks relief from § 137.41(c) to the extent necessary to require a Part 107 remote pilot certificate for the proposed agricultural operations in this petition for exemption.

§ 137.31(b) Aircraft requirements

§ 137.42 Fastening of safety belts and shoulder harnesses

Guardian Agriculture seeks an exemption from § 137.31(b) *Aircraft requirements*, and § 137.42 *Fastening of safety belts and shoulder harnesses*, which relate to the installation and use of a shoulder harness and safety belt on an aircraft. An exemption from these requirements is warranted because the MOE UAS does not have an onboard pilot and these regulations are intended to ensure the safety of the onboard pilot during crewed agricultural aircraft operations. For these reasons, granting the requested relief from §§ 137.31(b) and 137.42 in appropriate and will not adversely impact safety.

§ 137.33(a) and (b) Carrying of certificate

Guardian Agriculture requests relief from § 137.33(a) *Carrying of certificate*, which requires that a facsimile of the agricultural aircraft operator certificate be carried on the aircraft. The FAA has previously determined that relief from §§ 91.9(b)(2) and 91.203(a) and (b) for the carriage of the aircraft flight manual and aircraft registration onboard the aircraft is not necessary. Consistent with the FAA's prior analysis in the DroneSeed Exemption, an exemption is warranted here provided that a facsimile of the agricultural aircraft operator certificate and all certificates of registration are kept in a location accessible to the RPIC. Finally, given that MOE UAS will not have an airworthiness certificate, relief from § 137.33(b) *Carrying of certificate*, which requires the airworthiness certificate (if not carried in the aircraft) be kept available for inspection at the base of dispensing operation is conducted, is necessary. Guardian Agriculture will keep registration certificates available for inspection.

* * *

Guardian Agriculture has attempted to identify the appropriate FARs from which an exemption is needed in order to conduct the proposed operations in this Petition for Exemption. To the extent that the FAA determines that Guardian Agriculture needs an exemption from other FARs which are not addressed or explicitly named in order to conduct the proposed operations, Guardian Agriculture also seeks an exemption from those FARs for the reasons outlined above.

IV. PUBLIC INTEREST

Guardian Agriculture is an American company and the only large eVTOL UAS manufacturer in the United States building large eVTOL UAS intended for agricultural spraying operations. The proposed Part 137 agricultural operations will supplement or replace existing crewed aircraft while also substantially increasing pilot and worker safety. For example, the proposed operations significantly improve safety and reduce risk by alleviating human exposure to danger and emissions associated with current crop spraying methods, namely, the use of full size fixed-wing aircraft.

The proposed operations will also benefit the environment. Guardian Agriculture's approach to efficient, informed application, whether precise full field coverage or targeted spot applications, reduces the overall environmental impact of crop protection, and minimizes chemical resistance through improved accuracy. In addition, the MOE UAS is battery powered and creates no emissions. Use of a battery-operated UA rather than a fossil-fuel powered crewed aircraft for these operations adds to the environmental benefit for society. The reduced environmental impact from crop spraying operations is in the public interest.

Guardian Agriculture's agricultural operations with its large eVTOL UAS will also enable high value crop protection, fertilization, seeding, and associated services which will benefit American farmers, and the American public as a whole by supporting growing agricultural output needs in the U.S.

These proposed operations also further the public interest by minimizing ecological and crash impacts.

V. FEDERAL REGISTER SUMMARY

As previously noted, Guardian Agriculture believes that good cause exists for not publishing this Petition in the Federal Register. Nonetheless, if such publication is deemed necessary, Guardian Agriculture proposes the following summary for publication in the FEDERAL REGISTER:

Docket No.: FAA-2022-_____

Petitioner: Kiwi Technologies, Inc., d/b/a Guardian Agriculture

Section(s) of 14 CFR Affected: 61.3(a)(1)(i), 91.7(a), 91.119(c), 91.121, 91.151(b), 91.403(b), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), 91.417(a) and (b), 137.19 (c), (d) and (e)(2)(ii)(iii) and (v), 137.31, 137.33, 137.41(c), 137.42.

Description of Relief Sought: Guardian Agriculture Inc. is seeking relief to operate the Guardian Agriculture MOE UAS to provide commercial agricultural-related services in the United States. The MOE UAS is an electric vertical take-off and landing (eVTOL) multi-rotor aircraft designed to conduct Part 137 agricultural spraying operations in rural low-risk operating environment and has a fully-loaded take-off weight of 494 pounds. The petitioner intends to operate in Class G airspace with an altitude envelope of not greater than 100 feet above ground level (AGL). Operations will occur within visual line of sight of the pilot and during daylight hours only. The petitioner proposes to use a pilot in command holding a remote pilot certificate issued under 14 CFR part 107.

VI. CONCLUSION

For the foregoing reasons, Guardian Agriculture respectfully requests that the FAA grant this Petition for Exemption. Should you have any questions, or if you need additional information to support Guardian Agriculture's Petition, please do not hesitate to contact the undersigned.

Respectfully submitted,



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Matthew J. Clark
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d/b/a Guardian Agriculture*